UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Report Title:	CAA Inspection Report for Tug Hill
Inspection Date(s):	09/24/2019
Regulatory Program(s):	SIP, NSPS
Company name:	Tug Hill Operating
Facility Name:	Tug Hill & XCL Midstream
Facility Location:	Multiple Sites
Mailing Address:	1320 South University Drive Suite 500 Fort Worth, TX 76107
County/Parish:	Wetzel
Facility Contact:	Jerry DeRosa (724) 749-8388
AFS Number:	WV00005100249 – Greer ; WV00005100250 – Yoder; WV00005100266 - Heaven Hill 2; WV00005100269 – XCL Condensate
Permit Number:	N/A
NAICS:	211111 Crude Petroleum and Natural Gas Extraction
SIC:	3229

Attendees:

Facility Representatives:

Jerry DeRosa, Director EH&S, (724) 749-8388
David Morris, EH&S Compliance Specialist, (724) 579-8860
Chad Grinnell, Production Manager, (817) 201-1566

EPA Inspectors:

Bruce Augustine, Air Section, 3ED21, (215) 814-2131
Christopher Williams, Air Enforcement Division, (202) 564-7889

State/Local Inspector(s):

James Robertson, WVDEP Air Quality, (304) 926-0499 x1697

EPA Lead Inspector Signature/Date	_____ **Bruce Augustine**	**Date**
EPA Inspector Signature/Date	_____ **Chris Williams**	**Date**
Supervisor Signature/Date	_____ **Kristen Hall**	**Date**

Unique Project # WV00005100249 – Greer ; WV00005100250 – Yoder; WV00005100266 - Heaven Hill 2; WV00005100269 – XCL Condensate - 09/24/2019

I. Introduction

On September 24, 2019, the Environmental Protection Agency ("EPA") and West Virginia Department of Environmental Protection ("WVDEP") conducted Clean Air Act ("CAA") inspections at three Tug Hill Operating ("Tug Hill") and one XCL Midstream ("XCL") Oil and Natural Gas ("ONG") Production Facilities to evaluate facility compliance with permitting requirements and applicable State and Federal regulations. On Friday, September 20, 2019, Bruce Augustine notified David Morris, Tug Hill's EH&S Compliance Specialist, by phone and email of the CAA inspection. A copy of the email notification is included as Attachment 1 to this report

A. Summary of the Facility-

Tug Hill owns and operates wells and ONG production facilities in West Virginia. The wells are located in Marshall and Wetzel Counties. Tug Hill is headquartered in Fort Worth, TX. Tug Hill acquired a majority of their assets in West Virginia from Gasstar in December 2016. Most of these wells were drilled in 2013. Tug Hill currently operates 20-30 active production wells. Tug Hill operates four drill rigs and is actively developing sites in Marshall County.

According to the information on file at WVDEP, the Yoder and Greer sites have been issued G70-D general permits to operate by the WVDEP. The G70-D permit for Heaven Hill 2 or XCL Condensate permit were not reviewed by EPA. Each of these facilities are subject to the requirements of 40 C.F.R. Part 60 Subparts OOOO or OOOOa: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution. The applicability to these two regulations is dependent on the construction date of the affected sources and an emissions determination for storage vessel affected facilities.

B. Inspection Opening Conference-

The inspection team, including EPA Region 3 inspector Bruce Augustine and EPA AED inspector Chris Williams arrived at a Tug Hill water site in New Martinsville, WV at 8:40AM on September 24, 2019 for an opening conference. Representatives at the opening meeting from Tug Hill included: Jerry DeRosa, David Morris, and Chad Grinnell.

Bruce Augustine and Chris Williams presented their credentials to Tug Hill representatives and informed them that the purpose of the inspection was to evaluate the compliance status of their ONG production facilities with applicable requirements of the CAA. Bruce Augustine indicated to Tug Hill representatives that the inspections would include an on-site review of equipment and an emissions survey, as follows. For the emissions survey, the inspectors would use the Optical Gas Imaging ("OGI" or "FLIR") camera to observe hydrocarbon emissions from on-site equipment. Emissions observed with the FLIR camera would be confirmed with a Photo Ionization Detector ("PID") to document the presence of volatile organic compounds ("VOC"). The inspectors would also take photographs of equipment at each site visited. EPA and Tug Hill discussed their current operations in West Virginia the

facilities that EPA planned to inspect. Tug Hill representatives notified the inspectors of their on-site personal protection equipment and safety requirements. Bruce Augustine informed Tug Hill that any information that Tug Hill deemed to be confidential business information ("CBI") should be marked as such, and it would be handled as CBI according to EPA's CBI procedures. During the inspection, Tug Hill did not claim any information obtained as CBI.

II. Process Overview

Tug Hill drills and operates natural gas wells in both the Marcellus and Utica formations. Tug Hill drilled their first wells in 2017, while older wells (approximately 20-30) were drilled by another company, GASTAR in 2013, and then acquired by Tug Hill in 2016. Tug Hill stated that they conduct green completions during well drilling by routing separated gas into a sales pipeline during the flowback phase. Tug Hill indicated that they have a temporary flowback separator on-site during well completions, and only use a combustor to control vapors from flowback when there is a safety issue. A typical Tug Hill site consists of wells, gas processing units ("GPU"), produced water tanks, and a small combustor. The centralized tank battery sites include the same components along with intermediate separation equipment, dedicated condensate or oil and produced water tanks and a larger combustor. Newer well sites include sand traps near the wellhead to prevent any foreign material from entering the GPU.

From the wells, a hydrocarbon mixture of natural gas, oil, and water is sent via pipeline to ONG production facilities. In general, each facility operates dedicated three-phase separators, one for each well, to separate the hydrocarbon mixture into component streams. The produced natural gas is sent offsite via pipeline for sale or additional processing downstream of the facility. There is a sales meter located on the pipeline exiting the facility that records the volume of gas produced. The separated oil is sent via pipeline to a centralized tank battery.

Tug Hill tank batteries consist of multiple oil and produced water tanks; and the total number of tanks at each site is dependent on the number of wells sending material to the facility. The atmospheric storage tanks are 500 barrels and are pressure rated for 16oz/in^2. At the Tug Hill legacy well sites, oil is sent to a Williams facility via pipeline for further processing; and. At the newer Tug hill well sites (e.g., Yoder well site), produced oil is sent via pipeline to storage tank battery at a central production facility, called the Condensate Pad, which is owned and operated by XCL Midstream. At the Greer and Heaven Hill 2 well pads, oil is stored in a storage tank battery located at each pad. Produced water is unloaded from the Tug Hill well sites storage tanks by truck and taken to a water processing facility owned and operated by XCL Midstream. XCL Midstream, a sister company to Tug Hill, uses the produced water for well fracturing activities.

All of the oil and produced water tanks at the storage tank batteries are interconnected via a common vapor header. The header routes the tank vapors to a combustor to combust the vapors. The thief hatches located on the covers of each storage tank are typically set to vent at 16oz/in^2. The common vapor header is equipped with a pressure relief valve (or Enardo valve) that is set to release vapor to the atmosphere if the line pressure reaches its setpoint.

Currently, the Greer site is the largest producer of oil (1200bpd), followed by Yoder (700bpd) and Corley (500bpd). This completed the opening meeting and process overview.

III. Plant Tour/Walkthrough

Immediately following the opening meeting, the government inspection team performed inspections of three ONG facilities owned and operated by Tug Hill in Marshall and Wetzel Counties and one ONG facility owned and operated by XCL Midstream in Wetzel County. In general, the team inspected the separation equipment, storage tanks, vapor capture system, and combustion device at each tank battery. Emissions sources at each of the well sites were surveyed using the following equipment:

- Infrared (IR) camera manufactured by FLIR, Model GF320, Serial Number: 44401135. The GF320 is an optical gas imaging ("OGI") camera capable of detecting hydrocarbon emissions. Bruce Augustine operated the FLIR camera during the inspection.
- A PID to measure volatile organic compound (VOC) concentrations (excluding methane, ethane, and propane) in air. The PID was manufactured by Rae Systems, Model ppbRae3000, serial number 594-901619 (EPA Tag ID: B12349). Chris Williams operated the PID.
- A digital camera was used to take photographs in visible light. Chris Williams operated the digital camera during the inspection.

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The following is a summary of information obtained, observations made, and the OGI videos recorded during the emissions survey at each inspected facility. A photo log is included in Attachment 2 and a log of the OGI files are included in Attachment 3:

Site Name:	Yoder Pad
Longitude & Latitude:	39.78053559/-80.8400332
Date & time:	9/24/19; Arrived at 10:25 A.M. and departed at 11:05 A.M.
Number of tanks:	3 produced water storage tanks
Combustor temp. & pressure:	Small candlestick flare that cycles on/off. No temperature monitoring on this flare.
OGI filenames:	MOV_0359; MOV_0360
Digital photos:	074-081 – See attached photo log
Observations:	Equipment on-site: 3 produced water storage tanks, 5 wells, 5 GPUs, 1 candlestick flare The facility had 5 wells onsite. These wells were drilled in 2017 and began producing in 2018. The tanks at this site are produced water storage tanks which are 500bbl. The thief hatches are set to vent at 16oz/in2. There is no pressure relief valve on the closed vent system between the tanks and the flare at this site. There is a small candlestick flare (Hero Flare) that combusts vapors captured from the produced water

	tanks. The flare was observed cycling on and off as pressure increased in the header. Emissions were observed coming from the Enardo ES-660 thief hatch on PW Tank-03 using the FLIR camera. VOC concentrations at the thief hatch were 192ppm as measured by the PID. A FLIR video of the candlestick flare was also obtained. The 24-hour gas production volume from this site was 13,559 mcf while the site produced 600bbl oil in a pipeline and 600-700 bbl produced water stored onsite. Tug Hill stated that they conduct an initial LDAR screen of the site and then another site scan semiannually. Leaks are repaired within 30 days of detection. All of Tug Hills sites use OGI for leak detection and not EPA Method 21.

Site Name:	Greer Pad
Longitude & Latitude:	39.75770422/-80.83631739
Date & time:	9/24/19; Arrived at 11:17AM and departed at 12:36PM
Number of tanks:	20 storage tanks
OGI filenames:	MOV_0361 – MOV_0377
Digital photos:	082-0109 – See Attached Photo Log
Observations:	Equipment on-site: 20 storage tanks (16 condensate tanks and 4 produced water tanks), 11 GPU's, 2 sand traps, 11 wells, 1 stabilizer, 2 flash gas compressors, 1 glycol dehydrator,1 enclosed combustor The Greer tank battery was operating during the inspection. In addition to operating 11 wells, the site receives oil from other nearby well sites. The site operates a single enclosed combustor rated at 36MMbtu/hr. Ten of the wells are Marcellus and one is a Utica well. Each of the separators feeds the stabilizer. The sales line pressure at the site was 500-600psi. Emissions were observed from the ground from the two PRV's at the top of the tank battery. EPA climbed the battery and observed the tanks with the FLIR camera. There are 16 oil tanks and four produced water tanks. Emissions were observed from the thief hatch on every tank in the battery using the FLIR camera. VOC concentrations at the thief hatches ranged from 0.6 to 91ppm as measured by the PID. Inspectors observed salt build-up around several of the thief hatches, heard hissing from the PRVs, and smelled hydrocarbon odors while on top of the tanks. The tanks are equipped with Enardo ES-660 thief hatches.

Site Name:	XCL Condensate Pad
Longitude & Latitude:	39.744074/-80.798899
Date & time:	9/24/2019; Arrived at 12:51PM and departed at 1:42PM
Number of tanks:	12 storage tanks
OGI filenames:	MOV_0378-MOV_0381
Digital photos:	0100-0118 – See attached photo log
Observations:	Equipment on-site: 12 storage tanks (10 condensate tanks and 2 produced water tanks), 2 stabilizers, 2 flash gas compressors, 1 enclosed combustor, 3 inlet storage tanks, 1 NGL tank The XCL Condensate Pad receives oil and water from Tug Hill well sites. The site separates the oil and water and stores it in atmospheric tanks prior to removal from the site. Tug Hill constructed the site and sold it to its sister company in June 2019. The site receives 6000-7000bbl/day of condensate and removes water using 24-26 trucks/day. The Enardo hatches on each of the tanks is set at 12oz/in2 while the weighted hatches are set at 16oz/in2. Emissions were observed using the FLIR camera at the thief hatch on condensate Tank 5 and the weighted hatches on Tanks 9 and 10. VOC concentrations at the hatches ranged from 1 to 131ppm as measured by the PID. Emissions were also observed with the FLIR camera from the vapor return line during loading of a condensate truck. The driver changed the seal on the line and the emissions were not observed after resuming loading.

Site Name:	Heaven Hill 2
Longitude & Latitude:	39.809932/-80.713024
Date & time:	9/24/2019; Arrived at 3:21PM and ended inspection at 4:32PM
Number of tanks:	10 storage tanks
OGI filenames:	MOV_0382-MOV_0391
Digital photos:	0119-0131 – See attached photo log
Observations:	Equipment on-site: 10 storage tanks, 3 stabilizers, 2 flash gas compressors, 1 enclosed combustor, 3 vertical separators, 11GPU's, 8 wells, 1 Y-grade tank (not in service), 2 storage bullets The gas, oil, water mixture at this pad and from surrounding pads goes through the GPU's before going to one of the three stabilizers and to the flash gas compressors. The storage tanks at this site are rated at 16oz while the weighted hatches and thief hatches are set at 12oz/in2. There is a small Hero flare rated at 36MMBtu/hr. A large flame was observed from the flare tip. Emissions were observed using the FLIR camera from the thief hatches on Tanks 1, 2, 3, 4, and 6. These are all condensate storage tanks. Emissions

	were also observed with the FLIR at the hatches on produced water tanks 7, 8 and 10. VOC concentrations at the hatches ranged from 1.36-91ppm as measured by the PID. Emissions were observed from the vacuum side of the Enardo pressure relief valve on Tank 9. Over the previous 24 hours, the site produced 148,044mcf of gas, 3700bbl of oil, and 1700bbl of water.

IV. Records Review

No records were reviewed during the inspection. EPA did not request any records prior to the inspection.

V. Closing Conference

Following the plant walkthrough, EPA, WVDEP, and held a brief closing conference at the Heaven Hill 2 site. Tug Hill indicated that they utilize a pressurized liquid sample and the Promax model to estimate the daily max flow rate from the stabilizers. Also, discharge of product from the stabilizers is throttled at times. EPA indicated that emissions were observed from all of the storage tanks at the Greer site and almost all of the storage tanks at the Heaven Hill 2 site. Tug Hill stated that they had been in the filed prior to the inspection to tighten the hatches to prevent leaks and they stated that the leaks would be addressed according to their internal leak procedures. They also stated that the backpressure Enardo valve on the vapor header is rated at 5oz/in2. Tug Hill indicated that they would try to resolve the issues with emissions from the tanks which require a design review of their vapor capture system.

EPA stated that an inspection report would be forwarded to Tug Hill and WVDEP within 60 days of the inspection. The report would contain observations of the sites visited during the inspection. EPA indicated that Tug Hill is not required to respond to the report. Tug Hill confirmed that none of the information (including FLIR videos and photographs) were considered CBI. The only paper record obtained during the inspection was a map of the sites in the Marshall West and Big South areas operated by Tug Hill. No additional records were requested by EPA. This concluded the inspection and EPA exited the facility at approximately 5:00PM.

VI. Areas of Concern

The following have been identified as *potential* issues identified during the inspection. They are issues that require either further investigation by EPA or additional information or explanation by Tug Hill. Any additional information concerning these areas provided by Tug Hill would become useful in determining the extent of any future actions by EPA.

1.) *VOC Emissions from the Oil and Produced Water Tanks*- EPA observed emissions coming from the thief hatches and pressure relief (or Enardo) valves on the produced water and oil tank vapor control systems at all of the storage tanks at the Greer Site

and 8 of the 10 ten storage tanks at the Heaven Hill 2 Site. These emissions were documented with the FLIR camera and confirmed by Tug Hill representatives with their FLIR camera. The inspection team raised potential concerns about the design of the tanks, closed vent system, and vapor controls with the Tug Hill representatives.

VII. List of Attachments

1. 9/20/19 email from Bruce Augustine to David Morris
2. Photograph Log
3. FLIR Video Log